



A Conceptual Framework for Supply Chain Renovation

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Abstract

As a requirement of today's competitive environment, companies want to renew themselves in a changing world. Renovation is a new norm for renewing firms and supply chains. For successful renovation and development, it is needed supply chain reengineering methodology which is about analyzing the existing organization of supply chain, planning improvements tools and designs and then putting these improvements into practice. In this context, business process re-engineering is the key to the successful implementation of effective management which has become a potentially valuable way of securing competitive advantage. The summary is to show through a combination of these methods how the performance of the supply chain can be improved with the renovation and integration of processes at various tiers in the chain. In this study, information is given about supply chain renovation concept and requirements of this concept have been defined and a detailed literature review was conducted. With the results of the literature study, the deficiencies of new concepts were identified and described. Business benefits, challenges and solutions in supply chain management are examined for future researches.

Keywords: Innovation Management, Re-Engineering, Renovation, Supply Chain Management

Introduction

A supply chain is the set of business processes and resources that transforms a product from raw materials into finished goods and delivers those goods into the hands of the customer. Supply chain management (SCM) has been defined as “the management of upstream and downstream relationship with suppliers, distributors and customers to achieve greater customer value-added at less total cost” (Wilding, 2003). The goal of SCM is to integrate both information and material flows seamlessly across the supply chain as an effective competitive weapon (Childhouse and Towill, 2003). It has often been claimed that in the modern world the competition is no longer between single companies but between supply chains (Trkman et al., 2007).

Recent business development in the light of increased competition has caused many companies to explore new drivers in order to remain competitive. In this context, renovation is the key to the successful implementation of effective supply chain management which has become a potentially valuable way of securing competitive advantage (Grozniak and Maslaric 2010). A new business processes are gained by renovation of current business practice in order to fully realise the benefits of improved information quality and share.

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Why Chains Must Be Renovated?

After successful strategy preparation, companies have to identify areas of possible improvement in quality of product or service, lead times or operational costs. This step takes an integral view of all organisations involved into the supply chain in order to renovate their operations towards supply chain excellence. Business Renovation (BR) or business process renovation and informatisation efforts integrate the radically strategic method of Business Process Re-engineering (BPR) and more progressive methods of Continuous Process Improvement (CPI) with appropriate IT infrastructure strategies. BPR seeks improvements by elevating efficiency and effectiveness of the business process that exist within and across organizations. On the opposite, CPI refers to minor and specific changes that one makes in an existing business process (Harmon, 2003). CPI relies on building a fundamental understanding of customers' requirements, process capability, and the root cause of any gaps between them by developing culture of continuous improvement in the areas of reliability, process cycle times, costs in terms of less total resource consumption, quality, and productivity. Six Sigma and Total Quality Management (TQM) are examples of approaches to CPI (Trkman and Groznik, 2009). According to Jacobson (Jacobson, 1995), we view business renovation as an umbrella concept for strategic IS planning, and both BPR and CPI since thorough and effective renovation should combine both, radical shifts (BPR) with those that permanently increase business efficiency and effectiveness (CPI).

From the literature sources of discontent in the supply chain that give rise to the need for reengineering can be summarised as follows:

1. incongruent objectives
2. disintegrated performance measures
3. unsynchronised decision-making
4. information asymmetry
5. misaligned incentives
6. fragmented business processes (Simatupang and Sridharan, 2005).

As can be seen from this list, problems are mostly collaboration and communication oriented which calls for a common reference framework for both supply chain management and SCRE. As precisely put by Tummala et al., 'by evaluating and mapping a specific supply chain, a company is able to find and reduce system redundancies while improving reliability and flexibility of a system (Tummala et al., 2006).

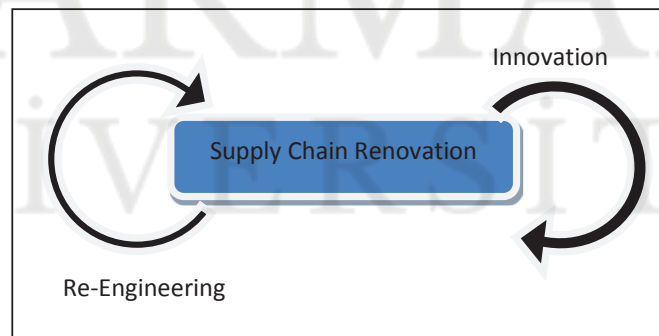


Figure 1. Supply Chain Renovation Elements



As shown in Figure 1 renovation occur from two elements. From that reason we examine literature in two part, re-engineering and innovation. Innovation starts after real time information flow ,and this information flow can be provided with re-engineering activities on business processes.

Supply Chain Renovation Model

Necessarily steps to create a new model are:

1. **Have a real time information system**- Supplying informatin is the most important part of supply chain management.
2. **Measure the current supply chain performance**- If you can not measure you can not improve a system
3. **Analyse the current system**
 - 3.1. Analyse customer demands and expectations –inward and outward
 - 3.2. Product, Process –with an innovative look
 - 3.3. Market trends
4. **Defign the Gaps**
5. **Renovate**- innovation with new mwthodolgy and tools
6. **Act new model**
7. **Control the results**

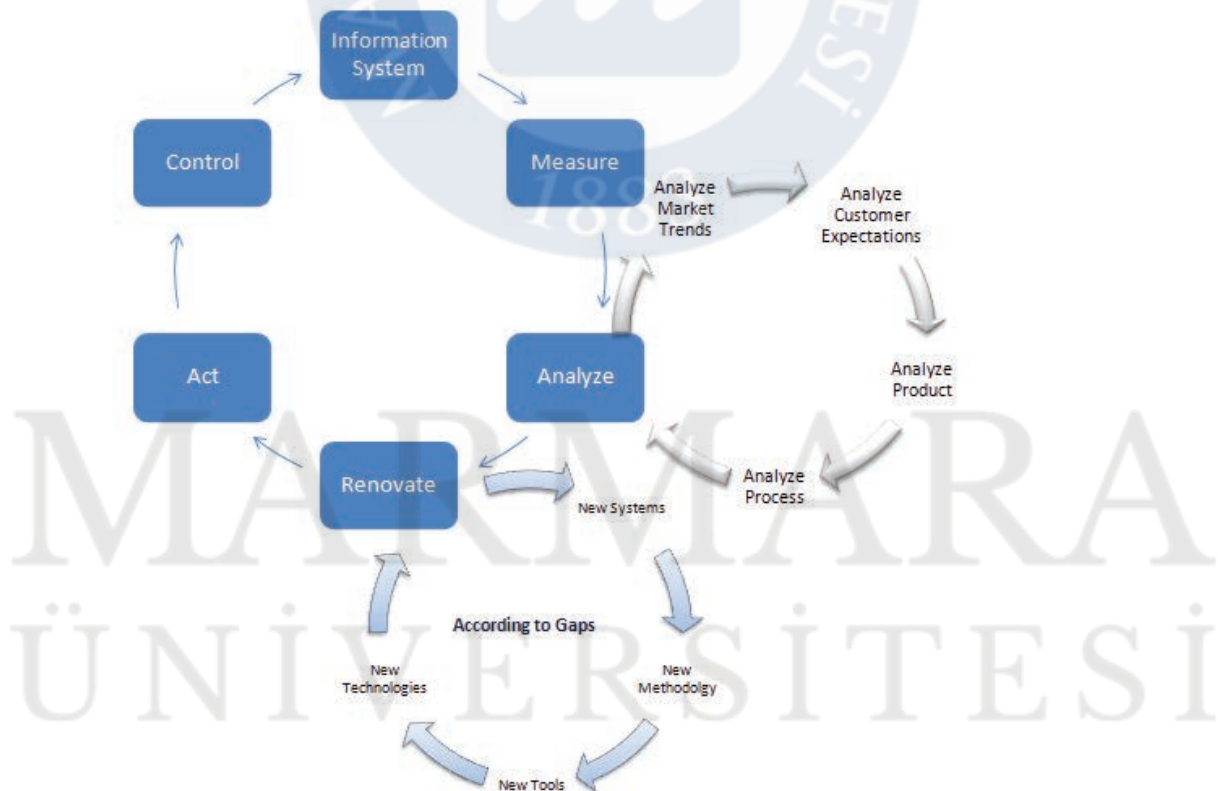


Figure 2: Renovation Model Progress Cycle



The model starts with the main purpose of the supply chain renovation problem which is to improve the performance of the supply chain; if you cannot measure you cannot improve. The idea of using performance management frameworks for greater purposes other than pure performance management is not novel. Indeed for instance, in their article titled Using the balanced scorecard as a strategic management system, Kaplan and Norton (1996) propose a four step (translating the vision, communicating and linking, business planning, feedback and learning) spiral mechanism to manage a company strategically. Cuthbertson and Piotrowicz (2008) have found through a literature review that supply chain measures can be applied in decision-making process, helping to define, test and implement new strategies, and other improvement opportunities. SCRM built on pillars which strategic, tactical, and operational aspects of the supply chain.

Current System occur from cultures, ideas, information, current, method and model process with new cases, circumstances, conditions, facilities and constraints. After these renovation process new culture, ideas, etc. will be formed. This new information, now we can call it knowledge, will return to our current information. And the cycle will start again. For that reason the firms that dominate the most of the market too, have to renovate their systems.

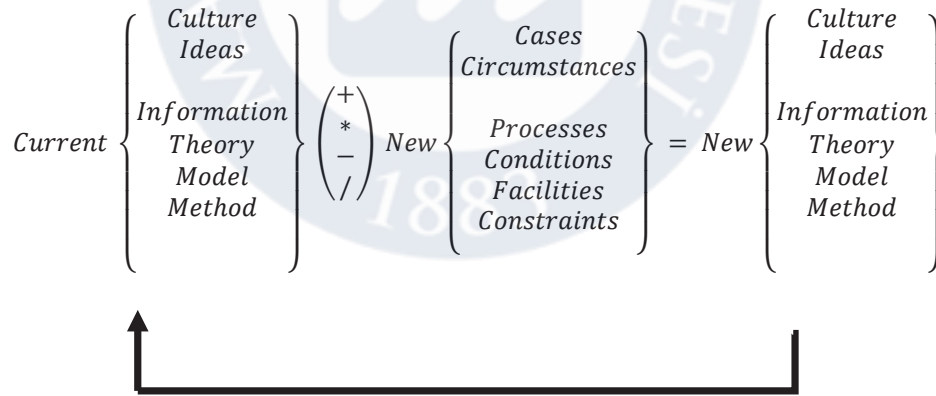


Figure 3 (Özen S, Maltepe University, Lecture Notes, Social Responsibility in Corporations 2014, Page 55)

Literature Review

Bevilacqua M. et al., 2009 used the business process reengineering (BPR) approach to create a computer-based system for the management of the supply chain traceability information flows. In this paper, they focus on the process modelling technique used by some of the leading tools in the field of business process engineering. Process models made with this technique are called event-driven process chains (EPCs). EPCs are used in tools such as SAP R/3 (SAP AG), ARIS (IDS Prof. Scheer GmbH), LiveModel/Analyst (Intellicorp Inc.), and Visio (Visio Corp.). They developed this traceability system for the supply chain of a company situated in the Tronto valley in central Italy. During reengineering process key elements were: (1) modelling “by production lots”, (2)



the correlation between the information flow and the production flow. They solve four main problem of supply chain with “traceability” activities (Bevilacqua M. et al., 2009).

Groznik A. and Maslaric M., 2010 investigated the potential of using BPR for improving supply chain performances and competitiveness. A definition of SCM, BPR and relevant issues was presented, together with an overview of the role of IT in supporting BPR. There followed a brief overview of business process modeling methods, with a case study providing an example of its use in oil downstream supply chain in one developing country. From this case is clear that this renovation project is justifiable from the cost and time perspective. The results in table and figure at below it's shown that a full improvement and effective supply chain management are only possible in the case of implementing both IT which enables efficient information sharing and the re-engineering of business processes. The mere implementing of IT without structural and organizational changes in business processes would not contribute to realizing the full benefit (Groznik A. and Maslaric M.,2010).

Transaction	Number	Average lead-time (h)	Average work (h)	Average wait (h)	Average costs (€)
Yes (AS-IS)	46	33.60	11.67	21.93	60.10
No (AS-IS)	17	8.43	2.40	6.03	8.47
Yes (TO-BE 1)	46	27.12	10.26	16.86	56.74
No (TO-BE 1)	1489	0.00	0.00	0.00	0.00
Yes (TO-BE 2)	46	12.85	4.88	7.98	32.54
No (TO-BE 2)	1489	0.00	0.00	0.00	0.00

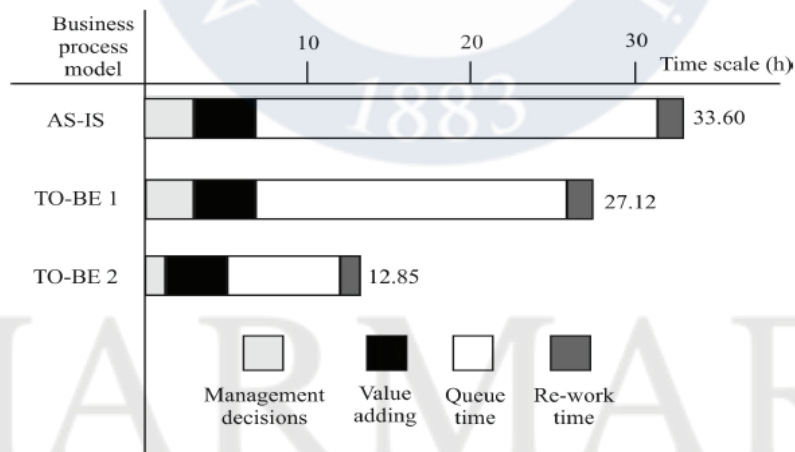


Figure 4: Output of new Model

Trkman P. and Groznik A., 2009 reviews latest findings in the most relevant areas, namely the importance of a proper supply chain strategy that is a pre-condition for business process renovation and mitigation of supply chain connected risks. The paper has tackled a vital challenge to provide a comprehensive review of several inter-connected challenges in supply chain management. Only continuous efforts in each of the mentioned areas assure efficiency and success. Nevertheless, optimal decision making is not possible since the choice set is too complex and generally unknown, due to the large number of possibilities and uncertainties (Trkman P. and Groznik A., 2009).



JDA Software has a case study about IKEA in 2010. IKEA was looking to change its supply chain strategy by cutting back on suppliers and focusing on those located in low-cost countries. IKEA discovered that this transition would mean enduring longer lead times that would force higher demands on the planning process. It would also prevent the retailer from quickly adjusting to changes and put extra pressure on IKEA's entire supply network. A global and regional supply planning system component would make it possible to coordinate sales, capacity and distribution planning, as well as link them directly to replenishment. The solution would also provide IKEA with visibility into the order-management process ([URL 1, 2010](#)).

Turhan D. and Vayvay Ö., 2011 presented a decomposition-based decision-making tool incorporating supply chain balanced scorecard performance measures for supply chain reengineering in this paper. Following a literature review on supply chain performance measures and reengineering models, various dimensions and approaches to supply chain reengineering are explored. Based on the insights gained, using the axiomatic design technique, a performance-based supply chain reengineering model is developed. In line with literature, the study conveys that there is still a large room for improvement for developing balanced supply chain measures that address different parts of the supply chain ([Turhan D. and Vayvay Ö., 2011](#)).

Stephens S. et al., 1997 explained the challenges in supply-chain reengineering and offer insight into the shape of future large-scale reengineering projects. Admittedly, no one has all the answers, but those who get supply-chain reengineering right will be winners in their markets. Supply-chain reengineering is the next hurdle in improving competitive position. Like many of today's technologies, the half-life of a reengineered process is short. This means that supply-chain reengineering will become an ongoing process requiring a continuous effort by all partners in the Supply chain ([Stephens S. et al., 1997](#)).

Groznik A. and Trkman P., 2007 showed the combination of the business process modeling and simulation methods how the performance of the supply chain can be improved with the renovation and integration of processes at various tiers in the chain and the sharing of information between companies. This combination of the methods enables an estimation of changes in lead times, process execution costs, quality of the process and inventory costs. The purpose of the case study is to show how the benefits of the supply chain process renovation and integration can be assessed by using the proposed combination of business process modelling and simulation. The case study presented in this paper deals with the fulfilment/procurement process in an SC that contains a petrol company (with multiple petrol stations at different locations) and a supplier which transports the petrol to the petrol stations from a few large warehouses ([Groznik A. and Trkman P., 2007](#)).

The purpose of the simulation is to estimate the optimal reorder point and the level of costs for this point for each simulation.

Three different situations were studied:

- the current situation in the AS-IS model (the level of petrol is checked once a day);
- the TO-BE model with the same number of orders (the level of stock is checked automatically every hour); and
- the TO-BE model with twice the number of current orders.

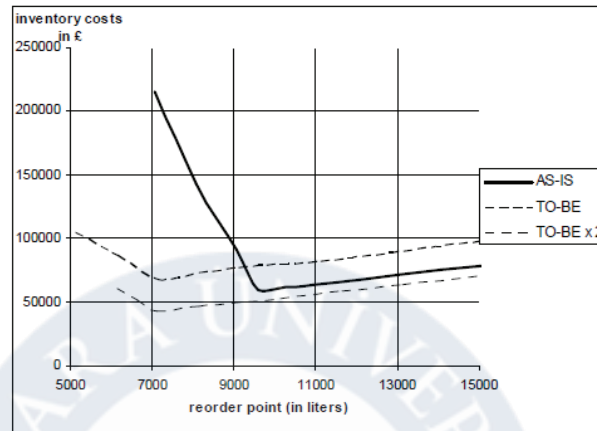


Figure 5: Total inventory costs in relation to reorder point (Groznik A. and Trkman P., 2007).

Groznik A. and Trkman P., 2009 had a case study of Slovenia about upstream supply chain management in e-government. The paper's main focus is the identification of the problems posed by ignorance of the supply chain management principles in e-procurement projects. The case study of the somewhat unsuccessful informatization of Slovenian public procurement demonstrates that the main challenges are not on the technological side but are instead connected with business process renovation, project management, unclear goals and responsibilities, and difficult coordination among various ministerial and governmental bodies. This paper substantiates the thesis that e-government should be viewed as a supply chain providing services to customers on the downstream side while integrating suppliers on the upstream side of the supply chain (Groznik A. and Trkman P., 2009).

Sweeney E., 2000 provides a basis for achieving world class standards for supply chains operating in all types of industry. There is a logical and systematic way of addressing the task of supply chain reengineering. This logical and systematic approach is referred to as the systems approach. The approach involves considering the whole supply chain and avoiding a situation where subsystems are optimized but whole supply chain is suboptimal. The process of supply chain analysis and improvement is complex; it requires total management commitment and dedicated resources. With this commitment and the necessary resources, the use of systems approach can result in significant improvements in supply chain performance (Sweeney E., 2000).

Table 1: Used methods and improvements of Supply Chain Renovation Studies

RESEARCHERS	METHODS	IMPROVEMENTS
Bevilacqua M. et al., 2009	Process Modeling Technique _ eEPC and eERM Logic	Quality improvement, improved promotion management and dynamic pricing, improvement of supply, logistics/distribution management, and an increased customer service level.
Groznik A. and Maslaric M., 2010	Process Modeling Technique _ Simulation of TO_BE and AS-IS models	Reduce lead time, eliminating waste and trimming process (Management decisions, Value. adding, Queue time, Re-work time)



Trkman P. and Grozni A., 2009	SCOR Model	Improvement in the area of reliability, process cycle time, costs in terms of less total resource consumption, quality, and productivity.
JDA Software, 2010	A global and regional supply planning system component	Quickly adjusting to changes, coordinate sales, capacity and distribution planning, as well as link them directly to replenishment.
Turhan D. and Vayvay Ö., 2011	Axiomatic design, SCRED model	Reduce waste and ensure efficient use of resources, reduce cost, faster delivery, improve quality. (include security, sustainability, resilience and innovation)
Stephens S. et al., 1997	3 stage engineering management and report cards on reengineering	Reduce costs and early morning shelf- stocking, improved competitive position, customer service, and cost effectiveness.
Grozni A. and Trkman P., 2007	Process Modeling Technique _ TO_BE and AS-IS models	Reduce operating costs, Shorten lead times, improve stock-out management
Grozni A. and Trkman P., 2009	e-Government, Critical Success Factor (CSF), SCOR Model, Development of an Upstream SC	Improve delivery performance, heterogeneous user groups, monitor costs, time and desired outcomes.
Sweeney E. ,2000	System Approach Methodology	Improvements in supply chain performances (Subsystems are optimized but the whole supply chain is sub-optimal)

Benefits Of Supply Chain Renovation

- The Big 3 auto makers strive to turn their suppliers into systems suppliers – not component makers. The outsourcing of key components reduces costs, but leads to strikes and plant shutdowns.
- Proctor and Gamble reports saving \$1.6 billion over five years and expects to save even more in the future through more efficient supply-chain management.
- Microsoft teams with Net Logistics to launch a zero cost Web site for conducting shipping transactions in a standard format.
- A coffee chain consolidates non-coffee product (muffins and other extras) delivery to reduce frenetic early morning shelf-stocking by multiple vendors.
- Improved global view of the business and Company
- Cost savings accrued from long-term commitments
- Reduced risk of imbalance between commitments and demand
- More efficient management system
- Market Improvement
- Strengthening Supply Chain Systems
- An estimation of changes in lead times, process execution costs, quality of the process and inventory costs.



Conclusion and Recommendations

- Most of the papers are focused on mathematical methods for supply chain optimization instead of an overview of business-related challenges connected to supply chains.
- The literature is rich in theoretical approaches to supply chain performance measurement, but at the same time there is a lack of empirical research, both qualitative and quantitative.
- In the literature, additional simulations are used to estimate changes in the quality level and costs of stock. It allows a deeper understanding of the consequences of introduced new technologies and intraorganizational IS as enablers of process and organizational changes.
- Business process renovation and integration should not be considered as a one-time project, as a permanent process performance measurement, analysis and a continuous improvement of supply chain processes.
- When problems are tied to the identification of users' needs, the connectivity with suppliers and the renovation of internal business processes, it become impossible without business process modeling and renovation.
- Bullwip Effect; One changing on one element of supply chain has large impact on all supply network. The renovation issues, Figure 5, has shown areas that can be affected by each other.

- ✓ **Human resources** - training and organization value development.
- ✓ **Project management** - communication and lack of management tools. Failure to assess project performance.
- ✓ **Management support** - goal-setting, sponsorship, continuity of involvement.
- ✓ **Change management** - addressing organizational resistance.
- ✓ **Tactical planning** - resource commitment and financial justification.
- ✓ **Process delineation** - measurable goals, scoping of process, scoping of effort, and incrementalism.
- ✓ **Strategic planning** - alignment with strategy and business vision for the project.
- ✓ **Time frame** - timeliness of implementation, ability to assure schedule performance.
- ✓ **Technological competence** - capabilities in technical areas of the project.

Figure 5: Renovation Issues (Stephens,Gustin,Ayers,1997)

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